What we claim is:

1. A method for forming an optical fiber preform, the method comprising pouring a slurry into a glass preform structure, the slurry comprising a dispersion of particles having an average primary particle size less than about 1 micron.

2. The method of claim 1 wherein the dispersant comprises water.

3. The method of claim 1 wherein the dispersant comprises an organic liquid.

4. The method of claim 1 wherein the dispersant comprises a gas.

5. The method of claim 1 wherein the slurry comprises at least about 1 weight percent powder.

6. The method of claim 1 wherein the slurry comprises at least about 10 weight percent powder.

7. The method of claim 1 wherein the particle have an average primary particle size no more than about 500 nm.

8. The method of claim 1 wherein the particle have an average primary particle size no more than about 100 nm.

9. The method of claim 1 wherein the powder effectively includes no particles with a diameter more than about ten times the average diameter.

10. The method of claim 1 further comprising removing the dispersant after pouring the slurry into the glass preform structure.

11. The method of claim 10 comprising applying pressure, heat or a combination thereof to compact the powder after removing the dispersant.

12. A method for forming an optical fiber preform, the method comprising directing a product stream in a flowing reactor into a glass preform structure to harvest at least a portion of the product stream within a cavity in the glass preform structure.

13. The method of claim 12 wherein the flowing reactor comprises a radiation beam intersecting a reactant stream at a reaction zone at which the product stream is generated.

14. The method of claim 13 wherein the radiation beam is generated by a laser.

15. The method of claim 12 wherein the glass preform structure is within the reaction chamber when directing the product stream into the glass preform structure.

16. The method of claim 12 wherein the product stream forms a powder coating comprising primary particles with an average primary particle diameter of no more than about 1 micron.

17. The method of claim 12 wherein the product stream forms a powder coating comprising primary particles with an average primary particle diameter of no more than about 100 nm.

18. The method of claim 12 wherein the flowing reactor comprises a reaction chamber and wherein the glass preform structure is external to the reaction chamber when directing the product stream into the glass preform structure.

19. The method of claim 18 wherein the product stream flows through a channel inserted within the cavity of the glass preform structure.

20. A method for forming an optical fiber preform, the method comprising inserting an insert within a glass preform structure, the insert comprising a powder coating wherein the powder coating comprises particles having an average primary particle size less than about a micron.

21. The method of claim 20 wherein the powder coating is formed in a flowing reactor by placing the insert in a product stream of the flowing reactor.

22. The method of claim 21 wherein the flowing reactor comprises a radiation beam intersecting a reactant stream at a reaction zone at which the product stream is generated.

23. The method of claim 21 wherein the insert is rotated when forming the coating.

24. The method of claim 20 wherein the coating comprises a powder coating having primary particle with an average primary diameter of no more than about 1 micron.

25. The method of claim 20 wherein the coating comprises a powder coating having primary particle with an average primary diameter of no more than about 100 nm.

26. The method of claim 20 wherein the coating is approximately uniformly distributed around the rod.

27. The method of claim 20 wherein the coating comprises a rare earth metal.